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WI-FI Controlled Mulching Paper Machine

Ritesh Nikam[1], Vinayak Kondekar[2], Sourabh Khot[3], Ramgonda Patil[4], Shivswarup Patil[5], Mrs. J. A. Arbale[6]

[1,2,3,4,5] **UG Student,** [6]**Project Guide**

[1,2,3,4,5] Maharashtra State Board of Technical Education, Electronics and Telecommunication, Sharad Institute of Technology Polytechnic, Yadrav, Maharashtra, India

[6] Department of Electronics and Telecommunication Engineering, Sharad Institute of Technology Polytechnic, Yadrav, Maharashtra, India.

ABSTRACT

This project introduces a novel approach to enhance the efficiency and control of mulching paper machines through the integration of Wi-Fi technology. Mulching plays a crucial role in modern agriculture, aiding in weed suppression, moisture retention, and temperature regulation. Traditional mulching paper machines often lack advanced control mechanisms, leading to suboptimal performance and resource utilization. The proposed Wi-Fi-controlled mulching paper machine aims to address these limitations by incorporating wireless communication capabilities for remote monitoring and control. The system comprises sensors for real-time data acquisition, including soil moisture levels, temperature, and machine status. These data are transmitted wirelessly to a central control unit, which can be accessed through a user-friendly interface via Wi-Fi connectivity .The Field of robotics has been exponential growth with the amalgamation of multiple domains. The holistic approach is proving to be a boon, where communication engineering, mechanical engineering, embedded system and so many more are together creating robot with high flexibility. Present technologies can only control robots up to a radius of 500 meters, but our aim in this project is to target controlling a robot from a remote location which is more than 1000 miles away. We use WIFI as the medium for communication.

INTRODUCTION

Wi-Fi control in the context of mulching paper machines enables farmers to remotely monitor and manage the mulching process, providing increased efficiency, flexibility, and real-time data access. This technology leverages the capabilities of wireless communication to enhance precision and automation, ultimately contributing to improved crop yields and resource optimization. The mulching technology for crop production was introduced by DIHAR in Ladakh , where a UV stabilized black mulch film of the recommended thickness in the laid on the field and the crop production on it. The mulch machine is the simple tractor attachment that can lay the mulch sheet on beds. Mulching plays a crucial role in modern agriculture by providing a protective layer over the soil, conserving moisture, suppressing weeds, and regulating soil temperature. The introduction of a Wi-Fi controlled system takes this practice to the next level, offering farmers greater control and real-time monitoring of their mulching operations. The integration of wireless technology and automation has significantly transformed various industries, and agriculture is no exception. One innovative application in modern agriculture is the development of Wi-Fi controlled mulching paper machines. Mulching, a widely adopted agricultural practice, involves covering the soil around plants with a protective layer to enhance crop growth, conserve moisture, and suppress weed growth. The introduction of Wi-Fi controlled mechanisms into mulching paper machines represents a leap forward in precision farming and smart agriculture.

The project is designed to control a robotic vehicle using an android application.WI-FI device is interfaced to the control unit on the robot for sensing the signals transmitted by the android application This data is conveyed to the control unit which moves the robot as desired. Remote operation is achieved by any smart-phone/Tablet etc., with Android OS, upon a GUI (Graphical User Interface) based touch screen operation. Transmitting end uses an android application device remote through which commands are transmitted.

I. METHODOLOGY

1. System Design:

a. Define the specifications of the mulching paper machine, including its dimensions, mulch dispensing mechanism, and power requirements.

b. Identify and select appropriate sensors for monitoring soil moisture, temperature, and machine status.

c. Choose a microcontroller or microprocessor that supports Wi-Fi communication and is capable of interfacing with the selected sensors.

2. Wi-Fi Module Integration:

a. Integrate a Wi-Fi module (such as ESP8266 or ESP32) with the microcontroller to enable wireless communication.

b. Configure the Wi-Fi module to connect to a local network or act as an access point for remote access.

c. Implement security measures, such as encryption, to ensure the integrity and confidentiality of data transmitted over Wi-Fi.

3. User Interface Development:

a. Design a user-friendly interface for remote monitoring and control. This could be a web-based interface accessible through a browser or a mobile application.

b. Include features such as real-time data visualization, machine status indicators, and control options for adjusting mulching parameters.

II. LITERATURE SURVEY

Mehmet can Gule , Murat, Orthun et-al implemented "Android Based Wi-Fi Controlled robot using Raspsberry pi" In this paper implementation is done for robot forward, backward, left, right and to display live stream of video using USB camera and raspberry pi board. Most inventive application is implemented to make people lives easier

1. Introduction to Precision Agriculture:

Overview of precision agriculture and its applications . Importance of automation and technology in

Modern farming practices. Existing challenges in traditional agricultural methods.

2. Wireless Communication in Agriculture:

Review of wireless communication technologies used in agriculture. Applications of Wi-Fi, Zigbee, LoRa, and other wireless protocols in farm automation. Benefits and challenges of using wireless communication in agricultural systems.

3. IoT in Agriculture:

Literature on the integration of IoT devices in agriculture. Applications of IoT in crop monitoring, irrigation systems, and smart farming. Case studies highlighting successful implementations of IoT in agriculture.

4. Mulching in Agriculture:

Importance of mulching in modern agriculture. Types of mulching materials and their benefits.

Challenges associated with traditional mulching methods.

II. MATERIAL USED

MULCHING PAPER:

Mulch is a layer of material applied to the surface of an area of soil. It is designed to conserve moisture, improve the fertility and health of the soil and control weed growth. Soil mulching also reduces the need for pesticides, fertilizers and irrigation. The technique of mulching is the easiest practice that you can. Under take for your garden that will produce unimaginable results. Mulch comes in two basic forms organic and nonorganic. The most frequent items used in organic mulching are grass, straw and bark. While the most frequently used items in non- organic mulching are stones, small chips of brick and even plastic. Taking the mulching task into your own hands can save you huge costs compared to having it done professionally.
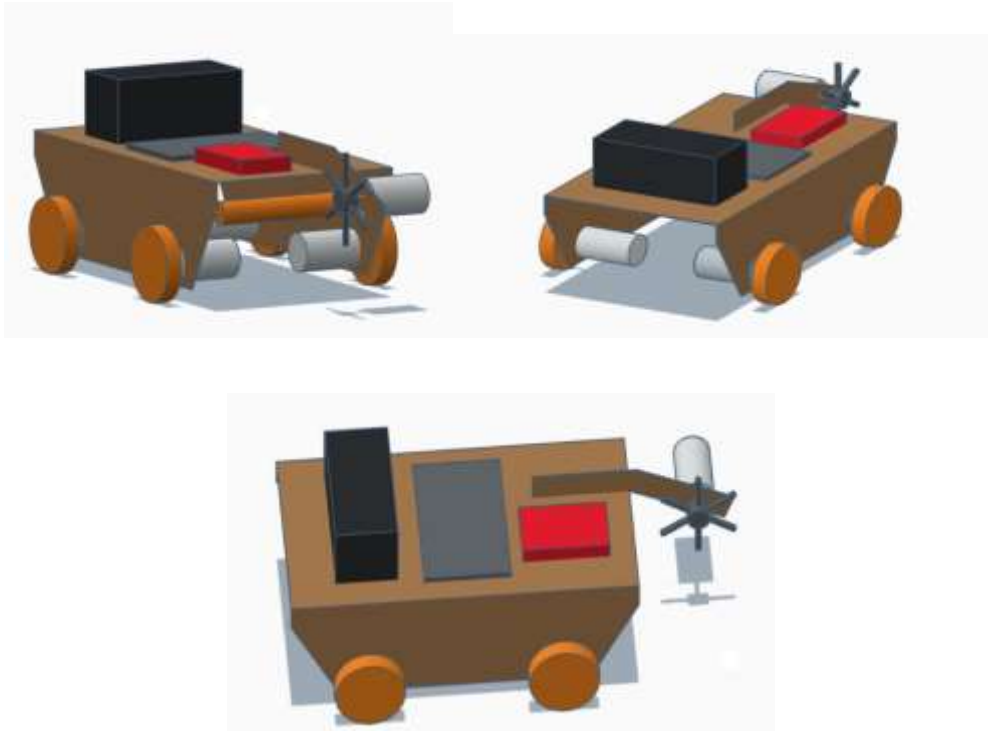
III. MODELING AND ANALYSIS

Figure: 3D view of Wi-Fi Controlled Mulching Paper Machine

IV. PROPOSED SYSTEM

A 12 Volt DC Power Supply has been apply to Microcontroller and Motor Driver. The Microcontroller text input and gives output to the Wi-Fi module. Here by directional arrow has been between the Microcontroller and Wi-Fi module. Motor Driver is the bidirectional arrow has been used between the Microcontroller and Mobile Control

Internet

A)   Hardware Circuit Diagram of Wi – Fi Control Robot Using Node MCU
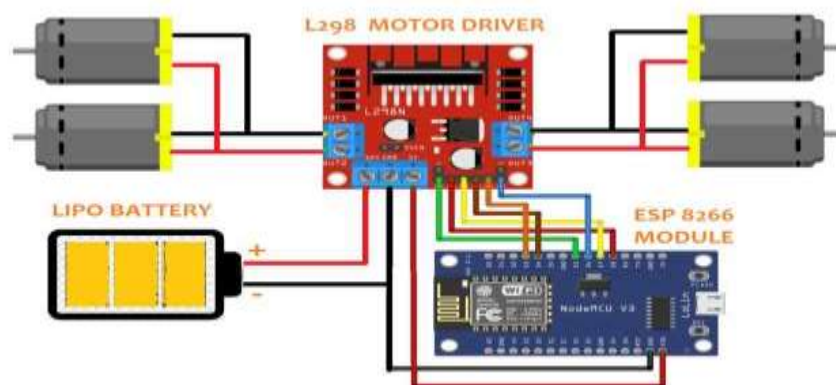
B)   BLOCK DIAGRAM OF WI-FI CONTROL ROBOT
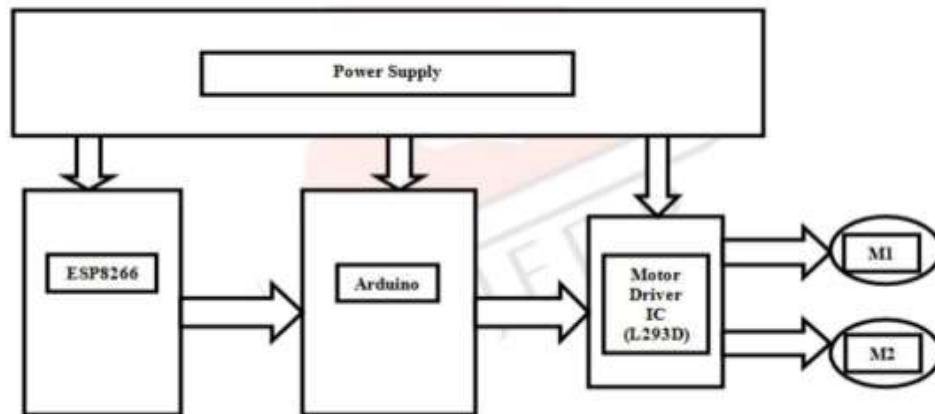
V. SCOPE OF THE PROJECT

In this work, Wi-Fi will be a key access technology for Internet of Things enablement due to cost coverage and bandwidth, challenges with mobile cellular which can be compromised through Wi-Fi. The motion of robot controlling via internet is one of the easy means as it requires the user to access the designated webpage to guide it. This system can be used in defence applications for detecting landmines in war field and for bomb detections by mounting a metal detector sensor on it. Further, the size of device can be miniaturized based upon specific applications. Further, the simulation of proposed work has been carried out using ARDUINO software and experimental values are validated with simulation parameters. Wi-Fi control typically refers to the ability to remotely manage and monitor devices or systems using a Wi-Fi connection. In the context of paper machines, incorporating Wi-Fi control can provide advantages such as real-time monitoring, remote troubleshooting, and efficient control of the machine

Future Development:

When GSM technology is integrated into a Wi-Fi-controlled mulching paper machine, it brings several features to enhance functionality and connectivity:

Remote Access: GSM enables remote access to the mulching paper machine, allowing users to monitor and control the device from anywhere with GSM network coverage.

SMS Communication: GSM facilitates SMS communication, enabling the machine to send alerts, notifications, and status updates via text messages to designated users.

Dual Connectivity: With GSM, the machine can switch between Wi-Fi and GSM networks based on availability and signal strength, ensuring continuous operation in areas with variable network conditions.

Security: GSM networks typically incorporate security measures, ensuring encrypted communication and protecting sensitive data transmitted between the mulching paper machine and the user.

Emergency Notifications: GSM allows for emergency notifications, ensuring that users are promptly informed of any critical issues or emergencies related to the machine's operation.

Low-Power Communication: GSM technology supports low-power communication modes, which can be advantageous for energy-efficient operation, especially when the mulching paper machine needs to conserve power during certain periods.

Integration with IoT Platforms: GSM connectivity facilitates integration with Internet of Things (IoT) platforms, enabling seamless communication between the mulching paper machine and other smart agricultural devices or systems.

By combining GSM technology with Wi-Fi, the mulching paper machine can achieve robust connectivity, ensuring reliable operation and efficient communication in diverse agricultural settings.

VI. CONCLUSION

Concluding a topic involves summarizing key points, findings, or insights. In this case, a conclusion might summarize the benefits of Wi-Fi control in a mulching paper machine. It could discuss increased efficiency, reduced downtime, and the ability to address issues remotely. Additionally, it might highlight the positive impact of mulching paper in agriculture or gardening, promoting soil health and plant growth.

VII. REFERENCES

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